REMARKS

The Office Action dated November 13, 2008 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claim 7 has been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added. Therefore, claims 1-8 are currently pending in the application and are respectfully submitted for consideration.

Claim Rejections Under 35 U.S.C. § 101

The Office Action rejected claim 7 under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. Specifically, the Office Action alleged that claim 7 claims a computer program, which is non-statutory. The Office Action suggested amending the claim to recite "a computer readable medium encoded with a computer program, which when executed, performs..." (See Office Action at pages 4-5).

Claim 7 recites "[a] computer program <u>embodied on a computer readable medium</u> ... the computer program being configured <u>to control a processor</u>...." Thus, contrary to the Office Action's position, claim 7 is not directed toward a computer program; instead, it is directed toward a computer program <u>embodied on a computer readable medium</u>. In rejecting claim 7, the Office Action appears to be emphasizing form over substance. Specifically, the Office Action appears to be taking the position that "computer readable medium encoded with a computer program," is statutory, where "computer program

embodied on a computer readable medium," is somehow non-statutory, even though both phrases are directed toward the same concept: functional descriptive material tangibly embodied on a computer readable medium. Applicants respectfully submit that the Office Action's emphasis on form over substance is not supported by U.S. patent law, or USPTO procedure, under the MPEP.

Nevertheless, claim 7 has been amended to more particularly point out and distinctly claim the invention. Specifically, claim 7 has been amended to recite "a computer readable medium encoded with a computer program, which when executed, performs ...," in the preamble, as suggested by the Office Action. Accordingly, Applicants respectfully submit that the amendment effectively moots the rejection, and respectfully request that the rejection be withdrawn.

Claim Rejections Under 35 U.S.C. § 103(a)

The Office Action rejected claims 1-2 and 4-8 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kondylis et al. (U.S. Patent No. 6,665,311) ("Kondylis"), in view of Cousins (U.S. Patent No. 6,618,385) ("Cousins"), in further view of Galand et al. (U.S. Patent No. 6,628,670) ("Galand"). The Office Action took the position that Kondylis discloses all the elements of the claims with the exception of numerous elements. The Office Action then cited Cousins and Galand as allegedly curing the deficiencies of Kondylis. The rejection is respectfully traversed for at least the following reasons.

Claim 1, upon which claims 2-5 are dependent, recites a method of allocating bandwidth in a first node that is operable in an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation. The method includes the steps of initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link, and determining, in the first node, a first new bandwidth allocation that approaches a first optimization condition for the flow. The method further includes the steps of communicating with the second node to determine a mutually-agreed upon optimal bandwidth allocation for the flow, and notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed. The method further includes the steps of adopting the mutually-agreed upon optimal allocation for the flow when reallocation is needed.

Claim 6 recites a network device configured to allocate bandwidth in an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation. The device includes a first communication unit configured to initiate a communication between the device and a node in the network that, together, are endpoints of a link in the network, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link, and a first processing unit configured to determine a first new bandwidth allocation that approaches a first optimization condition for the flow, wherein the first processing unit is operably connected to the first communication unit. The device further includes a second communication unit configured to communicate with the

node to determine a mutually-agreed upon optimal bandwidth allocation for the flow, wherein the second communication unit is operably connected to the first communication unit, and a third communication unit configured to notify neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed, wherein the third communication unit is operably connected to the first communication unit. The device further includes a second processing unit configured to adopt the mutually-agreed upon optimal allocation for the flow when reallocation is needed, wherein the second processing unit is operably connected to the first communication unit.

Claim 7 recites a computer readable medium encoded with a computer program to allocate bandwidth in an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation, which, when executed, is configured to control a processor to perform a first sub-routine for initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link, and a second sub-routine for determining, in the first node, a first new bandwidth allocation that approaches a first optimization condition for the flow. The computer readable medium, when executed, is further configured to control a processor to perform a third sub-routine for communicating with the second node to determine a mutually-agreed upon optimal bandwidth allocation for the flow, a fourth sub-routine for notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when

reallocation is needed, and a fifth sub-routine for adopting the mutually-agreed upon optimal allocation for the flow when reallocation is needed.

Claim 8 recites a network device configured to allocate bandwidth in an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation. The device includes initiation means for initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link, and determination means for determining, in the first node, a first new bandwidth allocation that approaches a first optimization condition for the flow. The device further includes determination means for communicating with the second node to determine a mutually-agreed upon optimal bandwidth allocation for the flow, and notification means for notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed. The device further includes adoption means for adopting the mutually-agreed upon optimal allocation for the flow when reallocation is needed.

As will be discussed below, the combination of Kondylis, Cousins, and Galand fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the features discussed above.

Kondylis describes an apparatus, method, and computer program product for effective communication routing of unicast and broadcast data traffic in wireless ad-hoc networks. The routing technique separates the signaling and data transmission portions

of a data frame such that the length of the signaling portion is independent of the length of the data portion. (See Kondylis at Abstract).

Cousins describes a network initialization process to determine the maximum available data transfer throughput, optimized bandwidth, and optimized transfer conditions in a **wired** network. (See Cousins at col. 3, lines 42-58). Specifically, the network initialization process also negotiates the number of twisted pair wires to use, detects and identifies scrambled wires, determines the compression scheme to use, etc. These parameters are then utilized in a predetermined well known modulation communications technique such as spread spectrum or Quadrature Amplitude Modulation (QAM) to accordingly adjust the data transfer rate between the two devices. Also, the negotiation session of Cousins seeks to establish the data transfer scheme between the two machines (e.g., **how data is transferred over various twisted pair wires**) and to determine the best use of the available bandwidth. Accordingly, part of this negotiation includes the selection of compression algorithms for use in the data transfer. Moreover, the negotiation further includes reservation of part of the bandwidth for isocronous data and/or other non-LAN uses such as streaming video. (See Cousins at col. 7, lines 40-52).

Galand describes routing path selection and bandwidth reservation to connections sharing a path in a packet switched ***wireline*** communication network. (See Galand at Abstract). Galand further provides exchanging of information (109) between the origin (access) node (100), the transit nodes (107) on the path, and the destination node (108). (104) Bandwidth Reservation replies from transit nodes and end node generate either a

call acceptance or a call reject (110). (105) a Link Metric Update process updates, in case of call acceptance, the modified link metrics. This information (111) is sent through the Control Spanning Tree to the Topology Database of each node in the network by means of a broadcast algorithm. (See Galand at col. 10, line 40 – col. 11, line 2).

Applicants respectfully submit that Kondylis, Cousins, and Galand, whether considered individually or in combination, fail to disclose, teach, or suggest, all of the elements of the present claims. For example, the combination of Kondylis, Cousins, and Galand fails to disclose, teach, or suggest, at least, "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link*," and "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed*," as recited in independent claim 1, and similarly recited in independent claims 6-8.

<u>1) "*an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation*"</u>

The Office Action took the position that Kondylis discloses "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," as recited in independent claim 1, and similarly recited in independent claims 6-8, because

Kondylis discusses enabling a set of transmitters to dynamically reserve bandwidth and adapt the reserved bandwidth according to traffic fluctuation for point-to-point packet data in wireless ad-hoc networks. (See Office Action at page 6). In other words, the Office Action is interpreting "*flow allocation*" as reading on the reserved bandwidth discussed in Kondylis, and interpreting "*guaranteed feasible*" as reading on the adapting of the reserved bandwidth. Applicants respectfully submit that the Office Action's interpretation of "*flow allocation*" and "*guaranteed feasible*" is erroneous for at least the following reasons.

According to U.S. patent law, and the MPEP, a patent examiner may only give a claim term "[its] broadest reasonable interpretation consistent with the specification." (MPEP § 2111 – Claims Interpretation; Broadest Reasonable Interpretation; see also *Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005)). The Office Action's interpretation of "*flow allocation*" and "*guaranteed feasible*" is not consistent with the respective definitions in the specification of the present application.

In defining "*feasibility*", the specification makes clear that a flow bandwidth allocation is not merely a bandwidth that has been reserved or a bandwidth that can be adapted. Instead, the specification clearly indicates that flow bandwidth allocations that are feasible are only those for which there exists a schedule that can realize them by taking into account interference relationships in the ad hoc network. For example, under the heading "***Rate feasibility***," the specification describes that embodiments of the invention may use a fluid model to describe the feasibility of bandwidth allocations in a

multi-channel ad hoc network. According to the fluid model, the rate (normalized bandwidth) r_f of a link flow f in an ad hoc network is the fraction of conflict-free slots allocated to flow f in a T-periodic schedule. Furthermore, according to the fluid model, a bandwidth allocation of flows R = (r1, ..., r_f, ... r_{F1}) is called feasible if there exists a conflict-free schedule that allocates to every flow f, a rate equal to r_f. (See Specification at paragraph 0062-0063).

This definition of feasibility and the feasibility conditions discussed in the specification allow embodiments of the invention to capture the interference relationships in wireless networks and also allow embodiments of the invention to realize both QoS objectives where the flow bandwidth allocations are known in advance (e.g. real-time traffic) and fairness objectives when the flow bandwidth allocations are not known in advance.

Kondylis merely discloses that a set of transmitters dynamically reserves bandwidth, and that the transmitters subsequently adapt the reserved bandwidth according to traffic fluctuation. (See Kondylis at col. 6, lines 13-19). In the network of Kondylis, the mere changing of a level of bandwidth reserved based on the measured traffic rate does not disclose, or suggest, a "*guaranteed feasible flow allocation*," because the changing is solely based on the measured traffic rate of the single reserved bandwidth and does not take into account other reserved bandwidths.

In the "Response to Arguments" section, the Office Action took the position that "applicant argues that 'feasibility' as defined in the 'specification' requires that there

exist a 'conflict-free' schedule," and that "the claim does not include any such definition of the term." The Office Action further took the position that "Kondylis, as agreed by the applicant, includes the bandwidth reserved for the flows to be transmitted." Finally, the Office Action took the position that "there must also be a conflict-free schedule since the bandwidth is "reserved" and therefore also reads on the feasibility defined by the current application." (See Office Action at pages 2-3).

As a threshold matter, Applicants do not argue that the definition of "*feasible*" is limited to the fluid model example disclosed in the specification of the present application. Instead, Applicants argue that the term "*feasible flow allocation*," as recited in claim 1 cannot be interpreted so broadly to read on a bandwidth that is merely reserved, or adapted, in light of the specification's clear definition of "*feasible flow allocation*." Kondylis does not use the word "feasible" or feasibility" in the context of flow allocation. Instead, as described above, Kondylis merely discloses reserving a bandwidth and subsequently adapting the bandwidth based on traffic fluctuation. (See Kondylis at col. 6, lines 13-19). It is the Office Action's contention that just because a bandwidth is reserved, and subsequently adapted, then the bandwidth is also guaranteed feasible. However, this broad interpretation directly contradicts the specification of the present application, which clearly states that a flow bandwidth allocation is only feasible when there exists a schedule that can realize them by taking into account interference relationships in the ad hoc network. (See Specification at paragraph 0062-0063).

Furthermore, Applicants respectfully submit that Applicants have not agreed to any characterization of Kondylis by the Examiner, as Kondylis is a new reference which was introduced in the most recent Office Action, and which was not used in any previous Office Actions. Notwithstanding this point, the disclosure of Kondylis does not support the Office Action's position that "there must also be a conflict-free schedule since the bandwidth is 'reserved,'" because Kondylis fails to disclose or suggest, how the reserving of a bandwidth affects other bandwidths in the network. In other words, when a bandwidth is reserved, or adapted, in Kondylis, there is no discussion of whether a schedule exists that can realize the rate of the reserved, or adapted, bandwidth by taking into account interference relationships in the network.

Furthermore, Applicants respectfully submit that Cousins does not teach or suggest a method for an "*ad hoc wireless network configured to support at least one guaranteed feasible flow allocation*," as recited in independent claim 1, and similarly recited in independent claims 6-8. Rather, Cousins is directed to **wired** local area (LAN) networks instead of **wireless** ad hoc networks. In wired networks, the bandwidth allocation of a particular physical link will not affect the bandwidth allocation of another physical link. In contrast, in wireless networks, the bandwidth the allocation of a particular physical link <u>can</u> affect the bandwidth allocation on other physical links. Thus, in wireless networks, the bandwidth allocation of other physical links, must be taken into consideration when adjusting the bandwidth allocation of the first physical link. Thus, one of ordinary skill in the art would readily understand that one cannot merely take the

method disclosed in Cousins, which relates to wired networks, and simply apply it in a wireless network, without making modification. Finally, the Office Action has failed to establish that Galand cure the deficiencies of Kondylis and Galand.

Accordingly, Applicants respectfully submit that the combination of Kondylis, Cousins, and Galand fails to disclose, or suggest, "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," as recited in independent claim 1, and similarly recited in independent claims 6-8.

<u>2) "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link*"</u>

Although correctly concluding that Kondylis fails to disclose, or suggest, "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link*," as recited in claim 1, the Office Action took the position that Cousins discloses the aforementioned element of claim 1. Attempting to support its conclusion, the Office Action interpreted "*flow sharing the link*," as reading on the single link discussed in Cousins, and interpreted "*possible bandwidth allocation adjustment*" as reading on the network initialization process, also discussed in Cousins. (See Office Action at page 10; See also Cousins at col. 6, lines 6-26, and at col. 7, lines 40-52). Applicants respectfully submit that the

Office Action's interpretation of "*flow sharing the link*" and "*possible bandwidth allocation adjustment*," is not reasonable, given the specification.

Regarding "*flow sharing the link*," the specification of the present application clearly distinguishes a flow from a link. Specifically, the specification states that a transmission is made up of one or more link flows, <u>which take place simultaneously on different physical links and generally do not interfere with each other</u>. Furthermore, the specification states that <u>a physical link is commonly shared with a number of logical link flows.</u> (See Specification at paragraph 0034). Thus, the specification clearly defines a link as a <u>physical connection</u> between two nodes, whereas the specification defines a flow as a <u>logical connection</u> between the two nodes <u>which uses a physical link</u>. The specification further distinguishes the term "*link*" and *flow*" by specifically stating that multiple logical flows may <u>coexist</u> on one physical link. Accordingly, the element "*the communication being related to possible bandwidth allocation adjustment of a flow sharing the link*" refers to adjustment of the logical connection of the two nodes, not the adjustment of the physical connection of the two nodes.

In contrast, Cousins merely discloses the bandwidth initialization of a physical connection, as opposed to a logical connection. Specifically, Cousins discloses a negotiation session between a Data Terminal Equipment and a Data Communications Equipment, where the negotiation session seeks to establish a data transfer scheme between the two machines, and specifically determines the best use of the available bandwidth <u>for that particular physical link</u>. (See Cousins at col. 7, lines 40-52). There is

no disclosure, or suggestion, in Cousins of setting up specific configuration parameters for a logical flow which uses the physical link. Thus, there is no disclosure, or suggest, in Cousins of a possible bandwidth allocation adjustment of a <u>flow</u> sharing the link.

In the "Response to Arguments" section, the Office Action took the position that Cousins does include flows sharing the single physical link between the two communicating devices, which reads on the claimed limitation of 'flow sharing a link' since there are a plurality of logical flows sharing this single physical link." (See Office Action at page 3). Applicants respectfully submit that this position is erroneous. Cousins describes that the negotiation includes reservation of part of the bandwidth for isochronous data and/or other non-LAN uses such as streaming video. However, in describing reserving part of the bandwidth for isochronous data, Cousins still frames the discussion in terms of the <u>physical link</u>. Cousins discloses reserving part of the bandwidth <u>of the physical link</u> for isochronous data. (See Cousins at col. 7, lines 49-52). There is no disclosure, or suggestion, in Cousins of reserving a portion of the bandwidth for <u>a particular flow which shares the link</u>. Thus, Applicants respectfully submit that the Office Action's interpretation of "*flow sharing the link*," as recited in claim 1, is unreasonably broad, given the specification.

Regarding "*possible bandwidth allocation adjustment*," the Office Action alleged that the discussion in Cousins of an network initialization process between an interface adapter 200 of a DTE and an interface adapter 200 of a DCE to determine network parameters discloses a "*possible bandwidth allocation adjustment*." Applicants

respectfully submit that one of ordinary skill in the art would readily understand that an <u>initialization</u> is not an adjustment.

In the "Response to Arguments" section, the Office Action alleged that "applicant [argues] about the term "adjustment" as benign an adjustment made to pre-existing parameters, [however] the claim never requires an adjustment to be made to pre-existing parameters." In response, Applicants respectfully repeat its position that one of ordinary skill in the art would readily understand that an <u>initialization</u> is not an adjustment. The Office Action further alleged that "[a]lthough there may or may not be any adjustments to be made to pre-existing parameters in the case of the cited prior art, it is an adjustment nonetheless." The Office Action provides no objective evidence to support its position that an <u>initialization</u> is an adjustment. Finally, the Office Action failed to establish that Galand cures the deficiencies of Kondylis and Cousins.

Accordingly, Applicants respectfully submit that the combination of Kondylis, Cousins, and Galand fails to disclose, or suggest, "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link*," as recited in independent claim 1, and similarly recited in independent claims 6-8.

<u>3) "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed*"</u>

Although correctly concluding that the combination of Kondylis and Cousins fails to disclose, or suggest, "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed*," as recited in claim 1, the Office Action took the position that Galand discloses the aforementioned element of claim 1. Applicantss respectfully submit that the Office Action's position is erroneous.

Galand discloses that a connection request is specified by the user via a set of parameters including origin and destination network address, and data flow characteristics. Galand further discloses that a bandwidth reservation process uses the connection request to reserve bandwidth on each of the links of the path, and the bandwidth reservation replies from the transit nodes and the end node generate either a call acceptance or a call reject. Subsequently, a link metric update process, in case of a call acceptance, updates the modified link metrics by sending the information through the Control Spanning Tree to the topology database of each node in the network through a broadcast algorithm. (See Galand at col. 10, lines 59-63).

Galand fails to disclose, or suggest, a <u>mutually-agreed upon optimal bandwidth allocation</u>. Instead, Galand discloses that a bandwidth reservation process reserves bandwidth on each of the links of the path. Neither the user, nor any of the nodes on the links of the path, have a say in what the bandwidth allocation should be. Furthermore, Galand fails to disclose, or suggest, notifying <u>neighbor nodes in the network</u>. Instead, Galand discloses that <u>all</u> of the nodes in the network are notified of the modified link metric, through a <u>broadcast algorithm</u>. The use of a broadcast algorithm signifies that

every node of the network receives the modified link metric. The message is not targeted to merely the neighbor nodes.

In contrast, according to embodiments of the invention, the optimal bandwidth allocation which is sent to the neighbor nodes is a <u>mutually-agreed upon optimal bandwidth allocation</u>. Specifically, according to embodiments of the invention, a first node (i.e. node i) initiates the rate adjustment process by sending an RT_UPD packet to a second node (i.e. node j), where the RT_UPD packet may contain a requested rate adjustment direction (e.g. increase or decrease) and amount (e.g. number of slots). Node j then responds to node i with an RT_UPD packet of its own. Then, <u>based on the exchanged information of the RT_UPD packets, the nodes decide on the direction and the amount of the adjustment</u>. (See Specification at paragraph 0057, steps 1-3). Thus, according to embodiments of the invention, the optimal bandwidth is a <u>mutually-agreed upon optimal bandwidth allocation</u>.

Furthermore, according to embodiments of the invention, after an optimal bandwidth allocation is mutually-agreed upon by nodes A and B, both nodes A and B, <u>and their possible affected neighbors</u> have updated their local schedules to flow f. (See Specification at paragraph 0057, step 11). The specification further discloses that, according to embodiments of the invention, in the case of a rate increase, the adjustment of the bandwidth allocation may require adjustment of bandwidth allocation for <u>other links adjacent to nodes A and B</u>. Thus, according to embodiments of the invention, a notification is sent to the affected neighboring nodes. (See Specification at paragraph

0057, step 6). Thus, in embodiments of the invention, the notification can be targeted toward neighbor nodes, rather than all of the nodes of the network.

In the "Response to Arguments" section, the Office Action took the position that broadcasting means that the message is sent to all of the nodes, which includes the neighboring nodes. However, as described above, the use of a broadcast algorithm signifies that every node of the network receives the modified link metric, and the message is not targeted to merely the neighbor nodes. Furthermore, the Office Action fails to respond to Applicants' arguments regarding "*the mutually-agreed upon optimal bandwidth allocation.*"

Accordingly, Applicants respectfully submit that the combination of Kondylis, Cousins, and Galand fails to disclose, or suggest, "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed*," as recited in independent claim 1, and similarly recited in independent claims 6-8.

Therefore, for at least the reasons discussed above, the combination of Kondylis, Cousins, and Galand fails to disclose, teach, or suggest, all of the elements of independent claims 1 and 6-8. For the reasons stated above, Applicants respectfully request that this rejection be withdrawn.

Furthermore, as an **alternative basis** for withdrawing the rejection, even assuming *arguendo* that the combination of Kondylis, Cousins, and Galand disclosed all the elements of independent claims 1 and 6-8, Applicants submit that one of ordinary skill in

the art would not be motivated to combine the references of Kondylis, Cousins, and Galand, as either Cousins or Garland would render Kondylis inoperable for its intended purpose.

As reiterated by the Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007), the framework for the objective analysis for determining obviousness under 35 U.S.C. § 103 is stated in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). Obviousness is a question of law based on underlying factual inquiries. The factual inquiries are: (a) determining the scope and content of the prior art; (b) ascertaining the differences between the claimed invention and the prior art; and (c) resolving the level of ordinary skill in the pertinent art. (See *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007); *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966); see also MPEP § 2141).

The Supreme Court in *KSR* noted that the analysis supporting a rejection under 35 U.S.C. § 103 should be made explicit. The court stated that "rejections on obviousness cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." (See *KSR*, 550 U.S. at 398, 82 UPSQ2d at 1396; see also MPEP § 2141).

Kondylis is directed to a **wireless** ad-hoc network, where, in contrast, Cousins is configured for a **wired** local area (LAN) network. The configurations of Kondylis and Cousins have different configurations and applications, such that, a person of ordinary skill in the art would not be motivated to combine both references as one reference would

render the other inoperable for its intended purpose. Therefore, a combination of Kondylis and Cousins is improper.

Referring to Galand, this reference generally describes routing path selection and bandwidth reservation to connections sharing a path in a packet switched ***wireline*** communication network. Galand further provides exchanging of information (109) between the origin (access) node (100), the transit nodes (107) on the path, and the destination node (108). A Bandwidth Reservation (104) replies from transit nodes and end node generate either a call acceptance or a call reject (110). A Link Metric Update process (105) updates, in case of call acceptance, the modified link metrics. This information (111) is sent through the Control Spanning Tree to the Topology Database of each node in the network by means of a broadcast algorithm.

In contrast, independent claim 1 recites, in part, "*[a] method of allocating bandwidth in a first node that is operable in* ***an ad hoc, wireless network*** *configured to support at least one guaranteed feasible flow allocation...comprising...initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link.*" Independent claims 6-8 recite similar limitations. In contrast, Galand refers to connections sharing **wireline** paths. According to an embodiment of the present application, the bandwidth allocation of a flow on one link of a wireless node depends on the bandwidth allocations of flows on other adjacent links of this node. In Galand's wireline case, each link is an independent resource for

connections sharing it. Furthermore, for similar reasons as those previously provided for Cousins, a person of ordinary skill in the art would not have been motivated to combine the teachings of Galand with that of Kondylis as the first reference refers to wireline paths where Kondylis refers to wireless network.

Instead of any articulated reasoning, with a rational underpinning, the Office Action merely makes the unsupported statement that "although wireless networks are more complicated than wired networks, the basic idea of bandwidth sharing is the same." (See Office Action at page 4). The Office Action fails to provide any concrete or convincing arguments as to how exactly the cited references of Cousins and Galand can be incorporated to Kondylis and yield the present application. Specifically, the Office Action does not provide any concrete or specific way to adapt the single-link wired network approach of Cousins and Galand to multi-link wireless ad hoc networks.

Furthermore, Applicants respectfully disagree with the Office Action's assertion that the basic idea of bandwidth sharing is the same. Applicants respectfully submit that one of ordinary skill in the art would readily understand that resource allocation in wired networks is very different than resource allocation in wireless ad hoc networks, and different mechanisms are needed to realize it. Furthermore, even within wireless ad hoc networks, there are many ways to allocate bandwidth. Therefore, Applicants respectfully submit that the Office Action's analysis fails to comply with the framework articulated in *KSR*, and respectfully submit that the Office Action has failed to establish a prima facie case of obviousness.

Applicants further submit that the combination of Kondylis, Cousins, and Galand fails to disclose, or suggest all the elements of claim 2. Claim 2 recites "*re-performing the initiating, determining, communicating, notifying, and adopting steps at a later point in time.*" The Office Action took the position that col. 6, lines 19-26 of Cousins discloses the aforementioned limitation of claim 2. However, the cited portion of Cousins merely discloses during a period of idleness, a network initiation process may continue in the form of an <u>ongoing</u> <u>calibration</u> to gather measurements and statistics to optimize communication over the link. (See Cousins at col. 6, lines 19-26). Thus, even assuming *arguendo* that the network initialization process of Cousins, disclosed the initiating, determining, communication, notifying, and adopting steps, the cited portion of Cousins fails to disclose re-performing the network initialization process. Instead, the cited portion merely discloses continuing the <u>calibration</u> associated with the network initialization process. Thus, Cousins fails to disclose, or suggest, "*re-performing the initiating, determining, communicating, notifying, and adopting steps at a later point in time,*" as recited in claim 2. Furthermore, the Office Action failed to establish that Kondylis or Galand cures the deficiency of Cousins. Accordingly, Appellants respectfully submit that the combination of Kondylis, Cousins, and Galand fails to disclose, or suggest, all the elements of claim 2.

Additionally, claims 2 and 4-5 depend upon independent claim 1, and, thus, Applicants respectfully submit that claims 2 and 4-5 should be allowed for at least their dependence upon independent claim 1, and for the specific elements recited therein.

The Office Action rejected claim 3 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kondylis, in view of Cousins, in view of Galand, and further in view of Counterman (U.S. Patent No. 6,724,727) ("Counterman"). The Office Action took the position that the combination of Kondylis, Cousins, and Galand discloses all the elements of the claims with the exception of "determining, in a first node, a first new bandwidth allocation that approaches at least one of a Max Min Fair condition and a Quality of Service guarantee condition." The Office Action then cited Counterman as allegedly curing the deficiencies of Kondylis, Cousins, and Galand. The rejection is respectfully traversed for at least the following reasons.

The descriptions of Kondylis, Cousins, and Galand, as discussed above, are incorporated herein. Counterman describes a method and apparatus for a communications system that prioritizes packets that are transmitted over a digital communication channel utilizing at least one error-correcting transmission path associated with a Quality of Service (QoS) objective. The QoS objective is used to select the appropriate transmission path (that may include forward error coding, scrambling, and interleaving) that satisfies the relevant metrics of the desired level of service quality such as packet latency, variation of the packet latency, information throughput, and packet error rate (PER). The communications system selects a transmission path that is associated with QoS objectives best matched to the QoS objectives as required by the originating application. (See Counterman at Abstract).

Applicants respectfully submit that the rejection is erroneous because Counterman fails to disclose, or suggest, at least, "*determining, in the first node, the first new bandwidth allocation that approaches at least one of a Max Min Fair condition and a Quality of Service guarantee condition,*" as recited in claim 3.

The cited portion of Counterman merely discloses that a communications system manages, monitors, and prioritizes packets and allocates bandwidth with a packet network in order to satisfy the QoS objectives associated with the originating application. (See Counterman at col. 1, lines 63-66). Applicants respectfully submit that this disclosure is merely a statement of an intended objective and does not enable one of ordinary skill in the art how to determine if a new bandwidth allocation approaches a Quality of Service guarantee condition. In other words, one of ordinary skill in the art would readily understand that are several systems for which one can allocate bandwidth to realize a QoS guarantee condition, but a method for achieving the condition differs from system to system. Furthermore, Applicants respectfully submit that embodiments of the invention, may not only realize QoS objectively, but also may realize fairness objectives in wireless ad hoc networks, a concept not disclosed in Counterman.

In the "Response to Arguments" section, the Office Action argued that "as previously shown, Counterman teaches the use of QoS Guarantees in a packet network." (See Office Action at page 4). However, as discussed above, Applicants respectfully submit that the Examiner has not previously shown that Counterman teaches the use of QoS guarantees in a wireless ad-hoc network because the Office Action has failed to

establish that Counterman provides an enabling disclosure of providing a Quality of Service guarantee condition.

Furthermore, in the "Response to Arguments" section, the Office Action alleged that "applicant further argues that the current invention also teaches the Max Min Fair condition in addition to the QoS guarantee condition" and that "the claim limitation only requires at least one of the Max Min Fair condition and a QoS guarantee condition." (See Office Action at page 4). Applicants respectfully submit that this is a mischaracterization of Applicants' arguments. Applicants agree with the Examiner that the aforementioned limitation only requires at least one of the Max Min Fair condition and a QoS guarantee condition, and have not argued that the aforementioned limitation requires both a Max Min Fair condition and a QoS guarantee condition. Instead, Applicants respectfully submit the Office Action has not shown that Counterman teaches the use of QoS guarantees in a wireless ad-hoc network.

Furthermore, claim 3 depends upon independent claim 1. As discussed above, Kondylis, Cousins, and Galand, whether considered individually or in combination, does not disclose, teach, or suggest all of the elements of independent claim 1. Furthermore, Counterman does not cure the deficiencies in Kondylis, Cousins, and Galand, as Counterman also does not disclose, teach, or suggest, at least, "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible*

bandwidth allocation adjustment of a flow sharing the link," and "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed,*" as recited in independent claim 1 Thus, the combination of Kondylis, Cousins, Galand, and Counterman does not disclose, teach, or suggest all of the elements of claim 3. Additionally, claim 3 should be allowed for at least its dependence upon independent claim 1, and for the specific elements recited therein.

For at least the reasons discussed above, Applicants respectfully submit that the cited prior art references fail to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1-8 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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Enclosures: Petition for Extension of Time
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